

Chapter 15

Nukes I Have Known

In earlier chapters, I have described some key experiences I have had at nuclear weapons tests: the Bikini fallout, chasing the YAG, the outer-island survey after CASTLE BRAVO, the DIABLO shelter test. Nonetheless, I haven't been able to share fully the ambiance and anecdotes of my weapons test experience. Below I have listed all of the test series during my career at NRDL. The ones in which I participated are in boldface:

CROSSROADS	June-July 1946	Bikini
SANDSTONE	April-May 1948	Eniwetok
RANGER	January-February 1951	Nevada
GREENHOUSE	April-May 1951	Eniwetok
BUSTER-JANGLE	October-November 1951	Nevada
TUMBLER-SNAPPER	April-June 1952	Nevada
IVY	October-November 1952	Eniwetok
UPSHOT-KNOTHOLE	March-June 1953	Nevada
CASTLE	February-May 1954	Eniwetok
TEAPOT	February-May 1955	Nevada
WIGWAM	May 1955	Pacific
REDWING	May-July 1956	Eniwetok
PLUMBBOB	May-October 1957	Nevada
HARDTACK	April-August 1958	Eniwetok

Don't ask me who chose all those crazy code names. I don't know. The rumor was that there was a single bird colonel in the Pentagon whose job it was to assign to all operations a code name that had not been used before. CROSSROADS occurred before I joined NRDL; in fact, before NRDL was formed, for that matter. It wasn't until 1951 that a test series occurred that was of interest to us fallout types. Until BUSTER-JANGLE, all shots were balloon, tower, or air bursts in support of the weapons laboratories. In B-J, however, the last two in a series of seven were a surface burst, SUGAR, and an underground burst, UNCLE. They were small nukes, about 1 kiloton, but they were the first land surface and undersurface detonations; so everybody wanted to study the fallout from them.

We weren't the only radiological defense lab by that time. In particular, there was an upstart group under the Army Chemical Corps at Edgewood Arsenal in Maryland. Some turf-war genius in the ChemCorps had coined the term, CBR, for chemical, biological, and radiological warfare. Since ChemCorps already was responsible for chemical warfare and protection in the Army, it seemed to them only reasonable to take on the other two, and since neither the Navy nor the Air Force had ever shown an interest in chemical warfare, maybe ChemCorps should be in charge of CBR for the whole defense department—get it? The problem was that the three forms of warfare had very little in common, either as anti-personnel agents or as to countermeasures against them. But that did not stop the turf wars, which went on throughout the 1950s.

At BUSTER-JANGLE, project proposals from NRDL, ChemCorps, and the Corps of Engineers were consolidated by the test command into a single project, which I was selected to lead. My first trip to the Nevada Test Site was on or about November 10, 1951. SUGAR was detonated on November 20th; UNCLE on November 30th. I made many more trips to the test site during the next six years. Typically, someone would meet me at McCarran Field (Las Vegas) where my flight from San Francisco would touch down around three or four in the afternoon. Once my baggage was in the trunk of the car, we would head up the strip to the Sands or the Desert Inn to have a drink and take in the lounge show. (The Mills Brothers were often there as well as Keely Smith and the Louis Prima band.) I would watch the action at the crap tables and blackjack for a while, play the nickel slots for an hour or so and maybe even play a little roulette. Then the group would have a prime rib dinner and sometimes the early dinner show. Then we would pile into the car and head up U.S. 95 toward the test site some 70 miles away.

The trip up the desert highway would be dark and empty except for a few lights at Indian Springs. About 25 miles beyond, one would pass a few house trailers occupied by “ladies of the night” who serviced the construction crews at the site and then we would turn to the right into an unmarked paved road. A few miles further on, a sign DESERT ROCK marked a road leading left to the Army’s tent city. (Thousands of troops were brought in to experience one of the many balloon or air bursts.) A mile beyond the Desert Rock turnoff, one encountered the Test Site fence and checkpoint, where one’s picture badge and travel orders were inspected and a phone call made. Soon, one was among the warehouses and barracks and hunting for the bunk that would be your home away from home for a few weeks.

The base camp, soon called Mercury, was a motley group of warehouses, barracks, mess halls, power plants, barracks-like offices and so on. It was located on the mesa along which ran U.S. 95 from Las Vegas to Beatty. The brow of the mesa northeast of Mercury overlooked Frenchman Flat and Yucca Flat further to the north. Frenchman Flat was a wide valley that sloped eastward to a dry lake bed. It was surrounded by scrubby-looking desert hills except in the north where a low pass separated it from Yucca Flat, which was more of the same. The brow of the mesa was the official viewing area for the various shots, most of which were detonated in or above Yucca Flat.

Yucca Flat was 20 miles or so from Mercury. One left after an early breakfast, took a box lunch or a C-ration with you, and spent the day setting up the project. One time, after we finished early setting up for SUGAR we decided to explore the mesa north of Yucca Flat. Bob Stetson was particularly eager to go and I was not far behind him. Exploration of a remote arroyo led us to an abandoned ranch house beside a lone tree guarding a spring. Enroute, we noticed tailings on the hillside. A jeep trail led to a played-out garnet mine dug into the hillside. It was in reasonable good condition with mine-car tracks still in place. Garnets winked from the walls of the tunnel in response to our flashlights. We gathered samples that turned out not to be of gem quality. Either the good stuff had been mined out or the garnets were for industrial use (grinding wheels and garnet cloth.)

I've described what we did at B-J in a previous chapter: how we used a crane to measure the radiation up to 50 feet above the ground and how Ernie Dhein's uniforms and equipment kept getting missed by the fallout. What I didn't mention was the smell. Every time we entered the fallout area I sensed a strange smell—a smell like you get when a griddle gets too hot on the stove; rather like “fire and brimstone”—hell, if you will. None of the other guys admitted to sharing my gift of smell and it wasn't until Dick Soulé and I were doing the outer island survey after CASTLE BRAVO that I got a confirmation that I could smell fallout.

Participation in field experiments had a lot of hurry-up and wait. There were a variety of ways to occupy oneself if one had access to a gassed-up vehicle. Death Valley was just a few miles to the west of U.S. 95. There was always someone at Mercury who knew the way. One day we found our way to Death Valley Scottie's legendary home and to a nearby ghost town whose name I have long forgotten.

During a later operation, I was introduced to another choice goof-off destination. About 10 miles beyond Indian Springs on the way to Las Vegas, a state road made off to the right into the high desert and upland. The land rose almost imperceptibly but a look out the back window would give a panoramic view of the desert valley far below. The heat of the desert would be replaced by a cool breeze. The desert cactus and scrub would be replaced by small pines and cool weather plants. The road would steepen and become curvy. Finally, there were real trees, the Toiyabe National Forest. There were campsites, view points, and picnic areas at about 9,000 feet. Charleston Peak (11,918 ft) loomed above, occasionally with snow. It was a good break from the hot, dusty desert of the test site.

The Las Vegas Slots

Las Vegas, however, was by far the most popular destination for those in search of rest and recreation. That is why there was never any lack of volunteers to pick up or deliver someone to the airport. Las Vegas even in the 1950s represented glamour, glitz, and cheap food and booze. Also, there was gambling. I never felt a need to gamble but it was fun and I earned a reputation for being able to milk the slots. The clue to how to win at the slot machines came from my secretary, Betty Abramo. She told me never to play a machine that was showing a plum or an orange in the first reel. The plums and oranges, she explained, were on the opposite side of the reel from the jackpot bars and the reel didn't shift very rapidly. A little research at Las Vegas (her experience was at Reno) revealed that she was right. These machines had three reels and were spring driven. One pulled down on the arm to cock the machine and send the reels into motion. The resulting spin was not random on all reels.

What I learned was that the left-hand reel, which stops first, rotated very nearly a full set of turns, ending up about where it had been. It only gradually moved around to the other side. The middle wheel was also nonrandom but it had greater fluctuations and rotation. The right-hand reel, which stops last, was random and could stop anywhere. So, I would go down a row of “one-armed bandits,” passing up the plums and oranges. When I

found one showing a jackpot bar in the left-hand reel, I would play it. I would have perhaps 10 to 20 plays to hit a jackpot before the left-hand reel worked away from the jackpot zone.

When one hit a jackpot, only a modest number of coins would be ejected by the machine but lights and whistles would go off and soon a casino representative would show up with the remainder of the jackpot. As he handed it over, he would insist that one play off the jackpot. One indication that the “system” worked was in the playoff. Twice in my visits to Las Vegas I hit another jackpot in playing off the first. The odds against this if the machines were truly random are astronomical.

Of course, modern slot machines are electronic marvels and do not have the characteristics of the older machines. The casinos didn’t care then as they were still getting their cut. It’s just that some other jerk were losing while I was winning. There weren’t that many 50 cent and dollar machines in those days to pick and chose from, so I generally played the dime and quarter ones. The high point came during Operation PLUMBBOB one time when I was called back to NRDL. Two junior naval officers attached to the Lab, one a Lieutenant and the other an Ensign, offered to drive me to the airport. We arrived about 45 minutes early, so we stopped off at the Golden Nugget. I hit four dime jackpots before I had to catch my plane. The officers were absolutely incredulous.

How I Became an Atomic Desert Rock Rat

The next opportunity after BUSTER-JANGLE to observe a contaminating ground burst at Mercury was Operation TEAPOT in 1955 where a 1-KT shot called ESS was scheduled. ESS was an underground shot and I wasn’t much interested in being involved, since it would be much like UNCLE in B-J. Unfortunately, I had elevated my profile at the Bureau of Ships by creating a concept of operations that became the basis for the Navy Passive Defense Plan (see Chapter 12.) Accordingly, my services were requested to be the technical director on AFSWP-Navy joint project 40.9 entitled “Passive Defense Operations Training.” The idea was to send representatives from all the Naval Shipyards and other Bureau of Ships facilities (and I think some places that AFSWP ran) to Mercury where I would train them in how to operate safely in a fallout area.

I had some ideas on operations in fallout areas, some of which I had had suggested to me by Dick Laurino and others involved in the preparation of Radiological Defense Volume II and some of which had come from my observations at BUSTER-JANGLE and TEAPOT. I had noticed at Operation CROSSROADS that the radsafe organization behaved like a sacred priesthood in sole possession of the truth. The rest of the test organization went nowhere in the fallout area except in the company of a monitor who had absolute authority over their activities. This procedure also was the operational mode at BUSTER-JANGLE. Each time a project team went into the field they were assigned a monitor who stayed with them during the whole mission. The problem was that project teams went into the fallout area once or twice for a few hours but there were dozens of project teams and only a limited number of monitors in the priesthood. As a consequence, the monitors often received too much radiation and had to be banished from the test site.

By the time of Operation CASTLE in the Pacific, the priesthood had learned its lesson. It qualified someone on each project team to act as the monitor. The priesthood was used to survey the fallout area each morning and to brief the project teams before they entered the contaminated zone. In TEAPOT, we would be on our own with me as the expert. I needed to take the trainees the next step. I needed to show them how to operate safely in a real wartime fallout area without either a priesthood or an expert to help them.

Another problem I foresaw was the cost of the survey meter. There might be a few in each military installation but hardly enough to give one to each work crew. The survey meter, which showed the exposure rate on a dial, was the workhorse of the monitor of the day. The dosimeter, which showed the accrued exposure, was much cheaper and could be more readily available. Even so, I doubted the day would ever come when every recovery worker could be given a dosimeter. I resolved to use this training project as an experiment to see if I could teach a work crew to operate safely with only a self-reading dosimeter in the hands of the crew chief.

While I was busy planning the Project 40.9 operation, I was notified that the test command had balked at basing the project at Mercury. After all, ours was a training project and all training was conducted from the Army's Camp Desert Rock. Otherwise, my basic proposal to survey the fallout area from shot ESS on the afternoon of the first day and to conduct training operations in the area on the second and third day was approved. At the time, I didn't react to the Camp Desert Rock edict. I was just happy my proposal was accepted.

Shot ESS was scheduled for March 23, 1955. I had the participants check in to Camp Desert Rock on the 17th. Desert Rock was much worse than I had anticipated. We were assigned to big army tents and small army cots. The tents did not have wooden or concrete floors. The desert sand was covered with two inches of crushed rock—very hard on the bare feet. There were about 20 of us. The Army assigned a lieutenant-colonel as our warden and interface with the troop environment. His name was Brasher or Brashear or something like that. We were assigned a dozen or more jeeps but they could not be taken off the test site. I was very happy that DeeJay and I owned two cars at that time and that I had decided to drive one to Nevada. Several other participants from West Coast shipyards had done the same, so we did have wheels with which to escape the rock floor tents when we could.

My schedule was a lecture in the morning followed by rehearsal and practice in the field. The shot was set up in Yucca Flat. A reconnaissance revealed an excellent field headquarters site on the western end of the ridge separating Frenchman Flat from Yucca Flat. It overlooked ground zero where a small hut marked the hole down which the nuke would be lowered prior to shot time. There were two circular dirt roads around the shot point, one a quarter mile out and one three-quarters of a mile out. Half a dozen radial roads ran out from ground zero in various directions. Instrument stations placed by other projects were alongside these roads.

On the second afternoon, I took the group to the command post site so that they could see the layout described above. We set up a field table on which to spread our maps. I also placed on the table my radiac (radiation detection meter) with it set to the most sensitive scale. When I turned it on, the needle started quivering and bouncing a bit. This was reassuring to me because it meant the radiac was functioning. We are always being bombarded by radiation from intergalactic space and because of previous nuclear explosions at the test site there was some lingering radioactivity around. If the needle was still, I would have a faulty meter, a situation which happened occasionally. Colonel Brashear came over to see what I was doing. He stared at the meter dial as if hypnotized and went “oooh, oooh” whenever the needle jiggled. I thought to myself “this military man is terrified of any and all radiation and will spook my trainees if I don’t do something.”

I called the group over to the table and showed them the quivering dial. “Like we discussed in the class yesterday, we are detecting ‘background radiation’ on the lowest, most sensitive setting. That shows that the instrument is working. When we enter the fallout area next week, this radiac will have to be set on a much higher scale.” I proceeded to turn the knob to the next higher scale and the needle inertly pointed to zero. The colonel was much relieved.

During the next few days, we did a few things to convert the desert shot area into a mock urban area for training purposes. For example, we named the two concentric circular roads and the radial roads after the shipyards from which the trainees came. So we could report the fallout situation at the corner of, say, Bremerton and Charleston. We actually put up street signs at the intersections, to the amusement of other project personnel in the area. At one intersection, we placed three mannequins equipped with film badges to measure the radiation dose received. One dummy was seated in the open, another in an open trench, and the last in a trench covered by a sheet of plywood heaped with earth except for a small opening at one end as an entrance. This was intended to demonstrate the value of shelter from the fallout. This little tableau would be the target of a rescue mission as part of the training. Not much of a mock urban area, was it? Yet it served the purpose.

In the class sessions, I taught the group how to control their radiation exposure, using only a dosimeter. I’ll skip the details here and just mention the concept of a “blocking dose.” I would specify the maximum dose (the “dose limit”) each team member should get on a mission, such as rescuing the mannikins mentioned above. The team leader would read his dosimeter when the team arrived at the scene and subtract the accumulated dose from the dose limit to arrive at the blocking dose. He would read his dosimeter periodically until he reached the blocking dose, whereupon the team would retrace its route out of the fallout area. If done correctly, the dose received on the way out would be slightly less than that going in. Thus, the dose limit would be adhered to.

Conducting a survey of the fallout area with only a dosimeter is a bit more complicated than one done using a rate meter. The object is to develop a plot on a map of key dose rates after a fallout event. With a rate meter, one goes to a known map location and reads the meter, noting the time of the measurement. Using a dosimeter, one reads the dosime-

ter upon arriving at the known map location, waits exactly three minutes, reads the dosimeter once more, subtracts the earlier reading and multiplies the resulting increase by 20 to get the rate per hour. The calculations can be done after returning from the fallout area. What I did was to assign each team a radial road or a circular road with instructions to make measurements at each intersection. They were to note the time and amount of each reading at an intersection. The calculations were to be done after they returned to the command post. The survey was done under a blocking dose so the teams wouldn't get over-exposed while gathering the data.

We watched the underground shot from a good observation point. I was delighted to note that the fallout cloud seemed to go northeast, which is where I had located the "rescue shelters." We were not operational on shot day. The priesthood did a survey that they briefed me on that evening, so I knew what to expect the next day. On Day 2 the teams did their survey. We compared results that evening. On Day 3, we rescued the dummies and read their dosimeters. That is when the training was crowned with embarrassment. We found that the dummies in the trench shelters had higher readings than those in the open! I was aghast. I went back to the site and checked with a rate meter. It turned out that the desert wind had blown the dry fallout into the trenches, which were more contaminated than the ground around them.

Life at the Pacific Test Site

In 1946, we traveled to Bikini Atoll by ship and lived aboard the USS Wharton in the lagoon. Every night there was a movie on the fantail. There also was an Officers Club among the handful of buildings on Bikini Island, the largest island in the ring that formed Bikini Atoll, where mixed drinks and beer could be had (none available on the Wharton or other commissioned vessels, of course.) There was swimming in the lagoon, at least before the underwater shot. But the best relaxation for me was to walk the beach on the ocean side of the island, hunting for shells cast up by the surf. There were all sorts of small and middle-sized seashells at the water's edge. One of the largest that I found was the base of a cone-shaped shell about three inches in diameter. The intact shell must have been six or seven inches long but this was just the base. I took it home as an ashtray and it still is on my desk, now filled with paperclips. The most attractive shell was the cowrie, a small white oval shell with the opening a slot on the underside and a raised gemlike top colored blue or pink. I was told that the natives used them as money. I became addicted and took home a sock full of them. I don't know where that sock of money cowrie is now. It is probably in the attic of one of the houses we used to live in.

In 1954, I went back to the Marshall Islands but not to Bikini Atoll. The operating base for the Pacific Test Range was now on Eniwetok Atoll, some 150 miles west of Bikini. Bikini Atoll was where the new superbombs were exploded. Instead of going to the Marshalls by ship there were military flights from Hawaii. Those early propeller-driven flights were awfully long. One arrived at Eniwetok feeling exhausted. The airstrip took up most of the longest island in the chain. After being processed through the security system, one reclaimed one's bags and clambered aboard a landing craft, together with the

mail, for the trip to the next island, Perry Island, where the technical personnel were housed and worked.

Perry Island probably once had palm trees and breadfruit trees like the uninhabited islands further on around the lagoon. Now it was virtually paved over. There were rows and rows of one and two-story barracks, some for sleeping and some for offices and shops, a smaller and more crowded version of Mercury at the Nevada Test Site. One difference were the diesel generators. They roared incessantly to provide the electric power. One could hear them anywhere on the island but because the sound was unceasing one quickly became used to it. Another difference was the lack of automobiles. There were a few trucks but generally one walked anywhere on the island and going elsewhere meant using a boat.

There were always a few naval vessels in the lagoon but most technical people were housed on Perry Island. When not working on project, there was always swimming in the lagoon for relaxation and exercise. There were officer's and enlisted men's clubs on the island for evening relaxation and a large open-air theater with a first-run movie every night. Perry Island had an excellent commissary selling all sorts of goodies but mostly bottle goods. It is incredible how cheap booze is with no taxes. Usually, we kept the bottles in our lockers and made our own martinis rather than go to the O-club. I will never forget being greeted upon arrival by Woody Armstrong with the sad news that there was no gin on the atoll and the next supply ship would not arrive for three days. That highlighted the isolation of the Pacific Test Range in contrast to the Nevada Test Site only an hour away from Las Vegas. Nonetheless, I visited the South Pacific four times, the last for Operation Hardtack in 1958. For the last two test series, Redwing and Hardtack, I was a desk-bound executive and don't really remember anything happening of significance beyond picking up shells on the beach.